

# May Measurement Month 2018: an analysis of blood pressure screening results from Australia

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## KEYWORDS

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May Measurement Month (MMM), originally initiated as a temporary solution to address the lack of blood pressure (BP) screening programs worldwide, emerged as an effective annual campaign to increase the awareness of hypertension. MMM18, a cross-sectional survey of volunteers aged  $\geq 18$  years was carried out during May 2018 predominantly in capital cities across Australia following the standard MMM protocol. Blood pressure screening along with additional information including anthropometric data and responses to questionnaires on demographic, lifestyle, and environmental factors were collected from 3 352 individuals across Australia. After multiple imputation, 1 026 (30.6%) adult Australians had hypertension. Of the 2 936 individuals not on antihypertensive treatment, 610 (20.8%) were hypertensive, and 237 (57.1%) of the 416 individuals receiving antihypertensive treatment had uncontrolled BP. In line with MMM17 results and other previous surveys, MMM18 revealed that close to one-third of the screened population (30.6%) had hypertension, 57.1% of individuals treated with BP-lowering medication remained uncontrolled indicating suboptimal management of the condition in the majority of patients. Most importantly, only 49.0% of those with hypertension were aware of their elevated BP, highlighting lack of awareness of elevated BP in nearly half of the affected population. Elevated BP was directly associated with alcohol consumption, overweight, and obesity. Our findings demonstrate the need for (i) continued efforts to increase BP awareness in the population, (ii) optimization of BP management strategies, and (iii) tackling some of the major contributors to BP elevation, including alcohol consumption and obesity.

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## Introduction

High blood pressure (BP) is the 4th leading risk factor contributing to disease burden and is responsible for 13.1% of total deaths in Australia.<sup>1</sup> In 2017-18, about one in three people aged 18 and over (34%) had high BP comprising of 23% who had uncontrolled hypertension and 11% whose BP was controlled using medication.<sup>2</sup> The Australian burden of disease database shows that hypertension contributes to 65% of the burden of hypertensive heart disease, 43% of coronary heart disease, 41% of stroke, 38% of chronic kidney disease, 32% of atrial fibrillation and flutter burden, and 3.6% of dementia.<sup>1</sup> Australia took part in May Measurement Month 2017 (MMM17), a concerted effort of International Society of Hypertension (ISH) expanding on the World Hypertension Day which had been introduced by the World Hypertension League (WHL)—to increase the awareness of elevated BP globally. The Australian MMM17 findings demonstrated a prevalence of hypertension of more than 30% with over 18% of hypertensive persons untreated and over 40% inadequately treated. These results provided motivation to repeat the campaign in 2018 to continue raising the awareness of hypertension in Australia and emphasizing the need to control elevated BP.

## Methods

The 2018 Australian MMM cross-sectional survey was carried out throughout the month of May with the involvement of most states. The Dobney Hypertension Centre at the University of Western Australia/Royal Perth Hospital served as the national coordinating centre. One or more of the state-wide leaders in the field of cardiovascular disease and hypertension from each state were identified and invited to participate and to co-ordinate the screening efforts locally. Ethics approval was obtained, and volunteer staff training, communication, and distribution of the MMM18 protocols and materials occurred via the official MMM website. Over 20 sites were set up in a wide range of locations across Australia. Hypertension was defined as a systolic BP of greater than or equal to 140 mmHg or diastolic BP of greater than or equal to 90 mmHg, or in those on antihypertensive medication. The mean of the second and third BP readings was used in defining hypertension, and in all analyses. Data were analysed centrally by the MMM project team, and multiple imputation was performed to impute the mean of the second and third readings where this was missing, as described previously.<sup>3</sup>

## Results

A total of 3 352 Australian participants were screened. The mean age was 42 years, comprising multiple ethnicities in varied proportions: 2 510 Whites (74.9%), 271 from South-East Asia (8.1%), 172 from South Asia (5.1%), 161 from East Asia (4.8%), 39 Black (1.2%), 27 Arabic (0.8%), 62 mixed (1.8%), 95 other (2.8%), and 15 unknown (0.4%) with 1 915 female (57.1%) and 1 432 male (42.7%) participants. Of the 3 352 screened participants, 170 (5.1%) previously participated in MMM17, 416 (12.4%) were on antihypertensive treatment, 150 (4.5%) reported having diabetes, 67 (2.0%) reported a history of myocardial infarction, and 55 (1.6%)

reported a history of stroke. Two hundred and fifty-nine (7.7%) respondents reported smoking, 1 516 (45.2%) reported alcohol consumption once or more per week. The mean body mass index (BMI) of respondents was 25.4 kg/m<sup>2</sup> and 16 (0.8%) of female respondents reported being pregnant ([Supplementary material online, Table S1](#)). After imputation, of the 3 340 individuals for whom a mean of the second and third reading was available, the age-standardized and sex-standardized mean BP was 124.1/79.7 mmHg in those not on any antihypertensive medications, and 136.2/87.0 mmHg in those on antihypertensive medications.

In MMM18, of the 3 352 individuals screened throughout the month of May, 1 026 (30.6%) had hypertension and only 503 (49%) of the hypertensive population were aware of their condition. Of the 2 936 individuals not on antihypertensive treatment, 610 (20.8%) were hypertensive, and 237 (57.1%) of the 416 individuals receiving antihypertensive treatment had uncontrolled BP, leaving only 42.9% of individuals receiving antihypertensive treatment with controlled BP and 17% of the overall hypertensive population having BP under control. The association between age and sex with systolic BP in Australians who were not receiving antihypertensive treatment showed a linear increase, with the mean BP being lower in females. For diastolic BP, the relationship showed an inverted U shape with highest levels at age 50-55 years in males and 55-60 years in females ([Supplementary material online, Figure S1](#)). After adjustment for age and sex (allowing for an interaction), significantly higher systolic and diastolic BP was apparent in patients with previously diagnosed hypertension, and those on antihypertensive treatment, emphasizing the need for more assertive treatment in such high-risk patients.

## Discussion

As part of the MMM18 campaign in Australia, 3 352 participants of multi-ethnic background were screened. In Australia, MMM18 detected that prevalence of hypertension was very similar to the MMM17 (31.2%) and Global 2017 and 2018 data (34.9% and 33.4%, respectively). Of the drug-naïve participants screened, MMM18 identified 20.8% with high BP in Australia and 18.4% globally. Furthermore, 57.1% of the individuals who received treatment had uncontrolled BP which is a substantially higher rate compared to the 40.1% seen globally.<sup>5</sup> These results are indicative of the high prevalence of hypertension and relatively low control rates of hypertension in Australia, on par with the worldwide and previous national estimates.<sup>3-5</sup> Importantly, only 49% of the screened individuals with hypertension were aware of their elevated BP, which is somewhat close to the 46.5% awareness recorded by the PURE study<sup>6</sup> but lower than 59.5% recorded by the global MMM18.<sup>5</sup> The findings of lower BP in pregnant women, the usual patterns of systolic and diastolic BP with age, and the association of alcohol consumption with increased BP were consistent with the national and global MMM17-18 data.<sup>3-5</sup> Well-established associations seen between higher BP and increasing age,<sup>7</sup> BMI,<sup>8</sup> alcohol status,<sup>9</sup> and lower BP in pregnancy<sup>10</sup> match the global data and strongly reaffirm the validity of the data obtained by this screening campaign. Our findings demonstrate the need for (i) continued efforts to

increase BP awareness in the population, (ii) optimization of BP management strategies, and (iii) tackling some of the major contributors to BP elevation including alcohol consumption, overweight, and obesity.

MMM limitations include the assessment of BP based on single set of three readings on a single occasion, thereby increasing the possibility of false negatives but more likely false positives in the diagnoses of hypertension. By design, MMM18 in Australia was not intended to be based on representative samples of the Australian states where screening took place predominantly in the major cities obscuring the true prevalence. The BP recordings were obtained in diverse environments with one-third of the screening sites set up in healthcare facilities which could result in self-selection of a greater proportion of hypertensive participants. In addition, the effect of diet and lifestyle advice given to hypertensive participants and the post-survey impact on awareness could not be assessed in this cross-sectional design.

## Supplementary material

[Supplementary material](#) is available at *European Heart Journal Supplements* online.

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